August, 1877, from Tokio to Hatsuishi (Nikko), and from Nikko to Takasaki; an account of the observations made by Dr. Naumann last summer during a journey into the little known western part of Nippon, and another at the same time into the north of that island by Herr Gebauer; and some information from the *Tokio Times*, by Y. Watanabe, on Chikuzen, a province in the north-west of the Kiushiu.

NOTES

THE following grants have just been made from the Research Fund of the Chemical Society to aid the carrying out of the following researches:—50*l.* to Dr. Wright, of St. Mary's Hospital Medical School for the continuation of his researches in chemical dynamics; 25*l.* to Dr. Armstrong for an investigation of camphor and allied compounds; 20*l.* to Dr. Carnelly, of Owens College, Manchester, for a research on the hydrocarbons diphenyl, ditolyl, &c., and their derivatives; 10*l.* to Mr. P. Phillips Bedson, of Owens College, Manchester, for a research on derivatives of phenyl acetic acid, and on the constitution of isatin; and 5*l.* to Mr. J. R. Crow, of Owens College Manchester, for a research on the action of zinc ethyl on the chloride of vanadium.

WE regret to announce the death, at Nice, of the celebrated Danish conchologist, Dr. A. L. Mörch.

WE hear with great regret, from an Italian correspondent, that the well-known astronomer, Father Secchi, has been seriously ill for several weeks, and that little hope is entertained of his recovery. The Roman correspondent of the *Lancet* states, however, that Dr. Ceccarelli, who is attending him, does not absolutely despair of his recovery. Father Secchi is not yet sixty, and is of robust frame.

AT the General Monthly Meeting of the Royal Institution on Monday, Dr. Warren De la Rue, D.C.L., F.R.S., in the chair, the special thanks of the members were given to Mr. William Bowman, F.R.S., for his present of an ivory bust of Prof. Faraday, by the late Matthew Noble, M.R.I. In reference to the telephone which Mr. Preece had explained to the members last Friday, the chairman stated that he had made attempts to measure the current produced by the vibrations of the disc of iron in front of the magnet of the telephone, and that he was unable to detect any by means of a most sensitive dynamometer which would render evident the current of a Daniell's cell through 2,000 ohms. Moreover, by other experiments made by other means, he concluded that the current produced did not amount to that which a Daniell's cell would send working through 100,000,000 ohm resistance.

THE New York *Tribune* gives an account of a public exhibition in that city of Eddison's Phonograph, which seems to have been very successful. The tones reproduced by the vibrating disk of the machine were so distinct that they could be heard and understood in different portions of the crowded room. Words spoken in a high key and with forcible emphasis were reproduced with much greater distinctness than those spoken in a low tone, even when the latter were uttered very loudly. A difference in the sound of different voices could be easily discerned. Several fragments of songs were sung in a high key and repeated by the machine with wonderful fidelity. The inventor stated that the machine has yet to be perfected before its full power is developed, and that ultimately it can be used to receive and reproduce the songs of popular singers as they are rendered on the stage.

AT a recent meeting of the Royal Society of Edinburgh, in connection with a letter from New York describing the phonograph, Sir William Thomson gave some explanation of the machine. All previous attempts to record sound were, he said, founded on the motion of a style or marker at a true parallel to the paper. Mr. Eddison's ingenious invention of the electric pen was different. It consisted of a fine point, which, by an excessively rapid vibration perpendicular to the paper, caused by a small electric machine connected with two thin wires to the point, left a trace of any person's handwriting in a row of very fine holes, from which the handwriting could be printed. Mr. Eddison, from this invention, elaborated the phonograph. By the greater or less pressure produced through the action of the alternate condensation and expansion of the air caused by the mechanism of the voice, the diaphragm operated upon the point and recorded the sounds. It was the most interesting mechanical and scientific invention they had heard of in this century. There could be no limit to its application. A man could speak a letter through the phonograph—it would be recorded on tinfoil, sent in an envelope through the post, and his friend, by applying the point of the phonograph to the tinfoil, could reproduce the words and tones uttered. In fact they could take down the singing of a Titiens (had we one), which might be reproduced to a tone two hundred years hence.

BOTH Houses of Legislature have unanimously passed a resolution giving the thanks of the U.S. Congress to Mr. Henry M. Stanley for his achievements in the field of African exploration. Mr. Stanley meets the Geographical Society in St. James's Hall to-night. It would be interesting to know how many applicants beyond the 2,000, which the hall will hold, have been disappointed. The officials of the Society have had a trying time of it in attending to the loads of applications they have received. Mr. Stanley will be entertained at dinner by the Society on Saturday.

IN connection with the recent election of Prof. Simon Newcomb as a foreign member of the Royal Society, it was stated that previous to that Prof. Asa Gray was the only living American who enjoyed that honour. We find, however, among the list of foreign members the name also of Prof. Benj. F. Peirce, of Cambridge, Mass.

WE have received an interesting volume: "Estudios sobre la flora y fauna de Venezuela," by A. Ernst. The author, in two ably written articles, gives a general idea of each of the two large kingdoms as they appear in Venezuela, and further adds some details on the fungi, orchids, molluscs, and birds of that country. The book is published at Caracas, and consists of over 100 quarto pages.

THE first meeting of the Institute of Chemistry of Great Britain and Ireland was held on Friday afternoon at the rooms of the Chemical Society, Burlington House. Prof. Frankland, F.R.S., the first President, read an address in which he gave an account of the origin of the institute. At a dinner given to Prof. Canizzaro on the occasion of his visit to London in May, 1872, Prof. Frankland drew attention to the increasing importance of chemistry in relation to the wants of communities, and suggested the usefulness of an institute that should be to chemists what the Colleges of Physicians and Surgeons are to the medical profession, the Institute of Civil Engineers is for civil engineers, and the Inns of Court are to the legal profession. Although the need of experts in connection with water and gas analysis, legal proceedings, and nuisances was recognised, and the application of chemistry to agriculture and manufactures was known to be of great importance, the suggestion was not taken up in a practical way until the beginning of 1876, when a meeting to consider the subject was held at the rooms of the Chemical Society on April 26. A committee was appointed to draw up a scheme for the constitution of the institute, which was laid before a meeting held in November. At one time it was thought that the objects might be effected by establishing a separate branch of the Chemical Society with the Fellows of the Chemical Society. After much discussion the formation of the present institute was decided on. The institute has power to appoint examiners as to the fitness of candidates for its membership. Prof. Frankland, in the course of his address, drew attention to the fact that under the Pharmacy Act of 1868 no one, not even the President of the Chemical Society, may call himself a chemist unless he is duly registered as a pharmaceutical chemist. There are already 225 members and 142 associates, and a fund of over 1,000*l.* for the new institute.

THE Naturwissenschaftliche Gesellschaft of Jena celebrated the twenty-fifth anniversary of its foundation on January 17 last. Upon that occasion Mr. Charles Darwin, Prof. M. I. Schleiden, of Wiesbaden, and Prof. Oscar Schmidt, of Strasburg, were named honorary members of the society.

FURTHER information shows that the earthquake of Monday, January 28, was felt at several places in London, at Ryde, Osborne, Southampton, and Lyme Regis. Shocks were felt in Neumarkt at 10 A.M. on the 27th and 5 A.M. on the 28th. At Judenburg (Upper Styria) two different shocks were felt on the 27th, at 10.6 A.M., and on the following day at 4.32 A.M. At Waldshut, on the Rhine, in the Grand Duchy of Baden, an earthquake was felt on the evening of January 16 shortly before midnight. The shock lasted about a second and seemed to proceed in the direction from south-west to north-east. Subterranean noise was plainly audible. The same phenomenon was simultaneously observed at Alb, Karsau, Beuggen, Schopfheim, and other places in Baden, as well as in all the north-westerly cantons of Switzerland.

THE recent investigations of Sergius Kern, resulting in the discovery of davyum to which we have had occasion frequently to refer, are being submitted to a careful examination in the Heidelberg laboratory under the direction of Prof. Bunsen. The results so far coincide with those of the Russian chemist, and it is to be hoped that the entire research may stand the crucial test of the leading authority on the platinum metals.

M. PICTET delivered, during the past week, two very interesting addresses in the laboratory of the École de Médecine, before the chemists of Paris, in which he gave a very complete and detailed description of his late experiments on the liquefaction of gases. He is a young man of scarcely thirty, an easy and fluent speaker, and made a pleasant impression on his Parisian auditory. A *brochure* of 100 pages, which he has just issued, with drawings, gives a very elaborate description of the whole series of experiments on the compression of gases.

THE Hon. Rollo Russell sends us some notes on experiments he has made which go to prove that there is no need to insulate the wires connecting a pair of telephones, at least when used for short distances. No. 18 uncovered copper wire was laid along grass and trees 418 yards, the two lines being kept well apart. Articulation and a small musical box were very well heard. The same wire buried for three yards in wet clay, the lines being about 5 ft. apart and the telephones 20 yards apart, gave good results, and it appears that the bare wires may be taken under roads, &c., without diminution of the audible effect. With the same wire taken across a pond, the lines being submerged in water about 40 yards, and lying on the grass the rest of the distance about 28 yards—the wires were about a yard apart in the water—conversation in low tones was distinctly heard when not overpowered by the noise of a strong wind blowing at the time. Probably No. 18 copper wire, uninsulated, might be laid across rivers and straits and used for telephonic purposes without appreciable loss of sound, as Mr. Russell, not in any of the above cases, noticed a feebler effect than with insulated wires.

INTERESTING antiquities have recently been excavated at Neumagen on the Moselle. The Roman poet Ausonius mentions in his "Mosella" that the Emperor Constantine possessed there a "beautiful castle," which was doubtless destroyed about the middle of the fifth century when Treves was several times ravaged by the Franks. About a century afterwards the famous castle of Nicetia was built by the Archbishop Nicetius, who probably utilised the foundations of the old Roman structure. Nicetia was rased to the ground in the year 881 by the Normans. Many of the old foundations are now being again excavated and are tolerably well preserved; the materials of which they are constructed are sandstone, marble, and limestone.

M. MARIÉ DAVY has published, through Gauthier Villars, the Montsouris Observatory's Meteorological *Annuaire*. The volume contains a number of important improvements.

THE first ordinary meeting of the newly-established Physical and Chemical Section of the Bristol Naturalists' Society was held on January 22 in the Library of the Bristol Museum. A paper was read by Mr. W. W. Stoddart, F.C.S., F.G.S., "On a Remarkable Occurrence of Indican in the Human Body." A paper was then read by Mr. S. P. Thompson, B.Sc., B.A., of University College, Bristol, "On Vortex Motion in Liquids." The paper was illustrated by experiments showing the production of smoke rings in air and of rings of coloured liquid in water. The author had lately tried the action of electro-magnetism upon the rings projected through water and had observed their retardation and partial destruction in passing through a powerful magnetic field. His experiments are at present incomplete.

THE third volume of C. L. Michelet's "System der Philosophie als exacter Wissenschaft" (Berlin: Nicolai) will shortly be published. It will contain the philosophy of the mind. The fourth volume will treat of the philosophy of history and will close the interesting and elaborate work.

EXPERIMENTS with a new telegraph apparatus have lately been made at Vienna, by means of which some 100 or 120 messages may be sent by a single wire in the remarkably short space of one hour. Under certain conditions this number may even be raised to 200 or even 250 messages. The inventor of the new apparatus is Herr August Eduard Granfeld, an Austrian telegraph official. At the end of December he presented to the Austrian "Telegraphenanstalt" eight working and two principal apparatus of his invention for practical trials. The experiments were crowned with complete success.

A NEW watchman-controlling clock has been constructed by Messrs. Fein at their telegraph works at Stuttgart, which on a single dial records the times at which a watchman visits any given number of stations however far apart, as well as the succession in which they are visited, and thus also the intervals which elapse while the man is proceeding from place to place. The same firm has constructed an automatic alarum for uninhabited or locked localities.

IT is stated that such enormous quantities of snow are now lying in the Austrian "Salzkammergut" as have not been seen there for the last fifty or sixty years, and a sudden thaw is dreaded extremely, as it would unavoidably cause enormous inundations. News from Pesth reports that on January 27 the Danube broke through the dykes at Dömsöd, and caused a vast inundation in Kumania, for a distance of some fifty miles, as far as Baja. Nine villages are under water. Other inundations are reported from the valley of the Vesdre River in the eastern part of Belgium.

AN exceptionally mild winter is reported from the north-western states of North America. In the districts near St. Paul, Minnesota, the farmers ploughed their fields in Christmas week. On Christmas Day excursions were made by steamer on the Mississippi River. In former years the river was generally frozen over on that day.

THE Vienna Society for the Protection of Animals offers a prize of thirty ducats in gold for the best pamphlet recommending the protection of animals. The little work must be of general interest and must be written specially for teachers. It must be in the German language and is not to exceed six sheets in print. Competitors must send in their manuscripts, on or before July 1 next, to the Committee of the Society at Vienna (Johannesgasse, 4).

IN the *Geographical Magazine* for January and February will be found Language Maps of India and Further India, including the Indian Archipelago, with accompanying text, by Mr. Robert Cust. Mr. Cust announces that he is collecting materials for a language map of Africa. Such a map already exists in Stanford's "Compendium of Geography—Africa," constructed by Mr. A. H. Keane, who, besides, gives there material for such a map to which, we should think, it would be scarcely possible to add. Is not Mr. Cust's work one of supererogation?

THE *Geographical Magazine* or February contains a curious and interesting autobiography of an Eskimo, Hans Hendrik, who served in the Arctic expeditions of Kane, Hayes, Hall, and Sir George Nares. It was written in Eskimo and translated by Dr. Henry Rink, who writes an introduction.

ETHNOLOGISTS will be interested in a paper in the February number of the *Geographical Magazine*, by Fr. A. de Röepstorff, on the inland tribe of the Great Nicobar. The author concludes that this tribe is certainly not Negrito, the specimen he saw having Mongolian characteristics.

THE mathematical reader will peruse with interest the eleventh number of the *Bulletin* of the Belgian Academy of Sciences (vol. xliv.), where he will find a paper by M. Ghysens, on the determination of volumes and superifices, being the application of an ingenious and new general formula to several difficult and interesting problems; an interesting note by Prof. Catalan, on a new principle of subjective probabilities; and a first paper by Prof. Folie, on the extension of the notion of the anharmonic relation.

THE movements of sediments in the sea it has been common to regard as exclusively an effect of wave-motion. M. Fuchs has recently pointed out that while this is an obvious cause, it is not the only one. Another factor (and one which is probably more powerful in its action), consists in the accumulations which the water undergoes periodically, partly through the flood-tide, partly through winds prevailing on the coasts. Suppose the sea on a coast heaped up ten to thirty feet (and this is not uncommon), the hydrostatic equilibrium must be thereby greatly disturbed, and a current must arise in the depths from the point of greater to that of less pressure, *i.e.*, from the coast to the deeper parts. If a calculation be made of the excess of weight caused by such accumulations of water, such enormous sums are obtained that it is easy to see how the current generated will be strong enough to move not only fine detritus, but large blocks, towards the depths.

THE additions to the Zoological Society's Gardens during the past week include a Banksian Cockatoo (*Calyptorhynchus banksii*) from New South Wales, presented by the Lady Ellesmere; a Common Badger (*Meles taxus*) from Scotland, presented by Lord Saltoun; a Brown Bear (*Ursus arctos*) from North Europe, presented by Mr. J. N. Allen; a Yaguarondi Cat (*Felis yaguarondi*), two Yarrell's Curassows (*Crax yarrelli*), two White-bellied Guans (*Ortalide albiventris*), a White-fronted Guan (*Penelope jacucaca*), a Common Trumpeter (*Psophia crepitans*), a Sun Bittern (*Eurypyga helias*), an American Kestrel (*Tinnunculus sparverius*), all from South America, purchased.

AMERICAN SCIENCE

THE eighth paper of Prof. Loomis' interesting series of "Contributions to Meteorology (*American Journal of Science and Arts* for January, 1878), treats of the origin and development of storms, violent winds, and barometric gradient, the data being obtained from the United States Signal Service observations. Of forty-four different storms recorded between September, 1872, and May, 1874, twenty-one (nearly a half) appear to have originated on or very near the chain of the Rocky Mountains (the others were of various origin). More than two-thirds of the whole originated north of latitude 36°. (We refer to this subject elsewhere.)

This number of the journal also contains some observations by Capt. Belknap, of the *Tuscarora* (during her cruise in the Pacific) proving once more that a cold stratum may exist in the ocean between two warmer ones above and below. The case occurred off the Kurile Islands, between 49° and 52° N. lat. and 158° and 167° E. long. The upper part of the stratum in one place, showing a temperature of 33°·7 F., was only twenty fathoms below the surface, while at ten fathoms below the surface the temperature was 41°. At a depth of 100 fathoms the temperature was 32°; below that curve to a depth of 200 fathoms the range of temperature was from 34°·5 to 38°·7. The width of the cold stratum gradually narrowed to a point in an easterly direction from the coast, or as the edge of the Japan stream was approached. (Several data are furnished regarding the currents in that region.)

An able revision of the atomic weight of antimony has lately been carried out by Mr. Josiah P. Cooke, jun., and the first portion of his paper to the American Academy on the subject is here given in abstract. A new mineral, pyrophosphorite, an anhydrous pyrophosphate of lime from the West Indies, is described by Prof. Shephard, jun. Prof. Rockwood furnishes notices of some recent American earthquakes; and Maria Mitchell, observations on Jupiter and his satellites, with the equatorial telescope at the observatory of Vassar College. Attention may also be called to a summary of the field work of the United States Geological and Geographical Survey of the Territories, under the charge of Dr. Hayden, for the season of 1877. The surveys in Colorado having been completed during the previous year, the parties prosecuted their work in a belt of country lying mainly in the western half of Wyoming, but also embracing adjacent portions of Utah and Idaho. Among other important results, Dr. White has demonstrated the identity of the lignitic series of strata east of the Rocky Mountains in Colorado with the Fort Union group of the Upper Missouri River, and with the great Laramie group of the Green River basin and other portions of the region west of the Rocky Mountains. The botany of the Survey was represented (it is known) by Sir Joseph Hooker and Prof. Asa Gray. Mr. Jackson has visited the strange ruins found in Northern New Mexico and Arizona, and procured the necessary data for plastic representation of the pueblos, or communal town dwellings, of Taos and Acorna, models of which he has constructed. Contact with Europeans has somewhat modified their ancient style of building, but one can readily see that they are constructed after their ancient prototypes, the dwellings of the forgotten people; forgotten, because the builders of the modern structures are as ignorant of the ancient builders as we are ourselves.

The first number of the *American Journal of Mathematics* will be published early this month, with contributions by Prof. Simon Newcomb, Mr. G. W. Hill, Mr. H. T. Eddy, Cincinnati, O., Dr. Guido Weichold, Zittau, Saxony, Prof. Cayley, Mr. H. A. Rowland, Prof. Charles S. Peirce, Prof. Sylvester, and Mr. William E. Story.

We recently announced that the *American Naturalist* has been removed to Philadelphia for publication under the management of Prof. Cope. This, with other new conditions, has given dissatisfaction to a number of the old contributors. This dissatisfaction has taken definite form and is expressed in a circular as follows:—"The undersigned, who have in past years contributed articles and by other means helped to support the *American Naturalist*, protest against the continued use of their names in the same connection under the new conditions advertised in the December number of 1877." The circular is signed by Profs. Agassiz, Gray, Whitney, Hagen, Shaler, Allen, Farlow, Dana, Marsh, Verrill, Newberry, Grote, and Lockwood.